

CASE REPORT

Endodontic therapy on a dentition exhibiting multiple periapical radiolucencies associated with dentinal dysplasia Type 1

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Abstract

Dentinal dysplasia (DD) Type I, is a hereditary disturbance in dentine formation. In this anomaly, teeth in both primary and secondary dentitions are affected, and radiographically show short and blunted roots with obliterated root canals and periapical pathosis. Management of patients with DD has presented dentists with problems. Extraction has been suggested as a treatment alternative for teeth with pulp necrosis and periapical abscess. Follow-up and routine conservative treatment is another choice of treatment plan in DD. Another approach for the treatment of teeth with DD has included periapical surgery and retrograde filling, which is recommended in the teeth with long roots. The purpose of this report is to present an unusual case of dentinal dysplasia Type I in a 22-year-old woman showing upper and lower teeth with obliterated root canals and periapical radiolucencies. In this case, conventional endodontic treatment was performed. Postoperative radiographs and clinical evaluation demonstrated periapical healing and successful results. Based on the results of this case report, conventional endodontic treatment for cases with pulp necrosis and periapical radiolucencies in dentinal dysplasia is highly recommended.

Introduction

Dentinal dysplasia (DD) is a rare hereditary disease, transmitted as an autosomal dominant character gene. Rushton used this term in 1939 (1) and characterised it as abnormal dentine that contains an enormous number of spherical bodies. In dentinal dysplasia, both the deciduous and permanent dentitions are affected and the teeth become loose and are exfoliated prematurely.

Witkop (2) in 1972 classified dentinal dysplasia into two types, radicular DD for Type I and coronal DD for Type II. In Type I DD, both the deciduous and permanent dentitions are affected. The crowns of the teeth appear clinically normal in morphology. Defects in dentine formation and pulp obliteration are present. In Type I DD, obliteration of root canals occurs much earlier by deposition of amorphous dentine or pulp stones (3). Radiography shows short, pointed or blunted roots and periapical radiolucencies despite the absence of dental caries (4–6). In Type II DD, the primary teeth are brown or opalescent blue in colour, similar to those seen in dentinogenesis imperfecta,

and the pulp chambers are completely obliterated, but these findings are not present in permanent teeth. No multiple periapical radiolucencies associated with dentinal dysplasia Type II have been reported (3).

In patients with dentinal dysplasia Type I, the pulps of the affected teeth tend to become necrotic following calcification, probably as a result of a deficiency in the nourishment and oxygen supply to the pulp. Periapical pathosis may then develop and result in apical resorption and tooth exfoliation. Management of patients with DD has presented dentists with problems. Extraction has been suggested as the treatment of choice for teeth with pulp necrosis and periapical abscess (5). Follow-up and routine conservation is an alternative treatment plan in order to retain the teeth as long as possible (6).

Tidwell and Cunningham (7) reported a case of Type II DD with relatively long roots treated by conventional endodontic therapy with short-term success. Coke *et al.* (8) managed a case of Type I DD with periapical curettage and retrograde root filling with 2 months of follow-up. Our report is of an unusual case that presented with

obliterated root canals and multiple periapical radiolucencies that was managed by conventional endodontic treatment resulting in a high degree of clinical success.

Case report

A 22-year-old woman was referred to Shiraz Dental School Department of Endodontics for endodontic evaluation of her teeth. The medical history of the patient was unremarkable. Clinical examination revealed an anterior open bite. The teeth exhibited normal shaped crowns but a slightly yellow-grey colour was observed. The teeth revealed no signs of attrition and no response to thermal and electrical stimuli were exhibited. Teeth 36 and 46 exhibited extensive carious lesions.

An orthopantomogram and periapical radiographs were taken, and they revealed that all the permanent teeth were present; obliterated pulp chambers were evident in all the teeth, even in unerupted third molars.

Short, spindly roots were present on all permanent teeth. The anterior, premolar and molar teeth (11, 12, 14, 15, 16, 17, 22, 25, 26, 27, 31, 34, 35, 37, 45 and 47) were asymptomatic but showed periapical radiolucencies and no apparent caries.

Teeth 36 and 46 showed extensive carious lesions with periapical pathosis (Fig. 1).

On the basis of the clinical and radiographic appearance, a diagnosis of dentinal dysplasia Type I was made. Systemic findings were unremarkable and the family history revealed no previous cases of such a problem. The patient was considered to be the first-generation sufferer.

The treatment approach that was planned in this case was conventional endodontic therapy. The untreatable teeth 36 and 46 were extracted because of extensive carious lesions. Each involved and savable tooth displaying periapical pathosis was scheduled for treatment. Rubber dam isolation was placed, access cavities were prepared,



Figure 1 Dental orthopantomograph of the case shows closed bite, obliterated pulp chambers, short and blunted roots as well as periapical radiolucencies. These features are characteristics of dentinal dysplasia.

and the root canals were instrumented with step-back preparation technique and copious amounts of 2.5% sodium hypochlorite solution for irrigation. Obturation was accomplished with a warm lateral condensation gutta-percha technique and Roth's 801 sealer (Roth International Drug. Co., Chicago, IL, USA). Coronal restoration was performed using amalgam or composite resin.

In the upper left lateral incisor (tooth 22), following a conventional access cavity, no sign of a canal system was found despite considerable penetration, and the canal was obturated to the mid-root level as a last resort.

Postoperative reviews of endodontically treated teeth at 3 and 6 months and from 1 to 4 years revealed that the teeth were asymptomatic. Radiographic examination showed complete resolution of the periapical lesions.

Discussion

The most extensive review of dentinal dysplasia was done by Ansari *et al.* in 1997 (6). This paper reviewed 52 cases taken from the literature and reported that endodontic therapy was attempted in only two cases. One was reported as a case of DD Type II with relatively long roots, which was treated by conventional endodontic therapy. The other was a case of DD Type I which was treated surgically with 2 months of follow-up.

In dentinal dysplasia, calcified pulp chambers, unfavourable crown-root ratio, periapical radiolucent areas and the nature of the periapical lesion are the characteristic findings that present the dentist with problems in the management of this condition. The exact mechanism responsible for the abnormal tooth development and obliteration of the pulp space in DD is unknown. Rushton (1), Logan *et al.* (9), proposed that multiple degenerative foci in the dental papillae became calcified, leading to reduced growth and final obliteration of the pulp space. Sauk *et al.* (4) suggested that it was not the dental papillae, but the epithelial root sheath that was responsible for the root development and that this invaginated too early, which then induced ectopic dentine formation in the pulp space. Wesley *et al.* (10) disagreed with these theories and proposed that the condition is caused by an abnormal interaction of odontoblasts with ameloblasts leading to abnormal differentiation and/or function of these odontoblasts. In dentinal dysplasia Type I, pulp necrosis and periapical pathosis are common findings present in the affected teeth. The authors of the present study believe that the pulp necrosis found in this condition occurs because of impairment in pulpal circulation and nourishment deficiency of the dental pulp, which renders the pulp susceptible to bacteraemia. Other authors attribute this finding to pulp contamination through the tunnels present in the defective dentine (11).



Figure 2 Dental orthopantomograph of endodontically treated teeth 4 years after the initial treatment (3-year recall), revealing complete resolution of the periapical lesions.

Histopathologically, the periapical radiolucent areas seen in most cases of dentinal dysplasia have been interpreted as radicular cysts; however, in some cases a diagnosis of periapical granuloma has been reported (8–10).

According to some reports, treatment of symptomatic teeth in Type I dentinal dysplasia that have undergone pulpal necrosis and periapical pathosis is extraction (12). Endodontic treatment has been recommended on the teeth with relatively long roots (7). Periapical surgery and retrograde root filling is another approach for the treatment of teeth with dentinal dysplasia (8). Another management strategy suggested by Steidler *et al.* is prevention (11). They recommended routine conservation and follow-up to prevent periodontal problems and dental caries in order to retain the teeth as long as possible. Our case report is unusual in that multiple periapical pathoses were associated with non-carious asymptomatic teeth. This case was also interesting because of the successful result following conventional endodontic treatment. At the 3-year

recall (Fig. 2), healing was complete, and the patient was delighted.

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